



BSI Standards Publication

Road vehicles — Fuse-links

Part 10: Fuse-links with tabs Type L (high current miniature)

INTERNATIONAL
STANDARD

ISO
8820-10

Second edition
2020-12

Road vehicles — Fuse-links —
Part 10:
Fuse-links with tabs Type L (high
current miniature)

Véhicules routiers — Liaisons fusibles —
Partie 10: Liaison fusible à languette type L (courant fort miniature)



Reference number
ISO 8820-10:2020(E)



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Published in Switzerland

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This second edition cancels and replaces the first edition (ISO 8820-10:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

- in [5.7](#), [Table 5](#) has been modified,
- in [5.9](#), [Figure 3](#) has been corrected,
- in [5.3](#), [Table 3](#) has been modified,
- in [Clause 6](#), [Figure 5](#) has been corrected,
- in [Clause 6](#), [Table 7](#) has been modified,
- [Annex A](#) has been revised.

A list of all parts in the ISO 8820 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Road vehicles — Fuse-links —

Part 10:

Fuse-links with tabs Type L (high current miniature)

1 Scope

This document specifies fuse-links with tabs (blade-type) Type L (high current miniature) for use in road vehicles. It establishes, for this fuse-link type, the rated current, test procedures, performance requirements and dimensions.

This document is applicable for fuse-links with a rated voltage of 32 V, a current rating of ≤ 60 A and a breaking capacity of 1 000 A intended for use in road vehicles.

This document is intended to be used in conjunction with ISO 8820-1 and ISO 8820-2. The numbering of its clauses corresponds to that of ISO 8820-1 whose requirements are applicable, except where modified by requirements particular to this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 8820-1, *Road vehicles — Fuse-links — Part 1: Definitions and general test requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8820-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Marking, labelling and colour coding

See ISO 8820-1 and [Table 1](#).

Table 1 — Fuse-link colour coding

Rated current, I_R A	Colour
20	yellow
25	white
30	green
35	dark green

Table 1 (continued)

Rated current, I_R A	Colour
40	orange
50	red
60	blue

5 Tests and requirements

5.1 General

In addition to carrying out the test procedures in accordance with ISO 8820-1, the following criteria shall apply.

Tests shall be performed following the test sequences in [Table 2](#).

The test fixtures for electrical tests shall be designed in accordance with [Figure 1](#). The connection resistance shall be 0,5 mΩ maximum for Type L fuse links to ensure the proper function of the test fixture.

Fuse-links according to this part of ISO 8820 shall provide for visible evidence of an open fuse-element.

5.2 Test sequence

Table 2 — Test sequence

No	Test		Clause/subclause	Sample groups						
				1	2	3	4	5	6	7
1	Dimensions		6	X	X	X	—	—	—	—
2	Marking, labelling and colour coding		4	X	X	X	X	X	X	X
3	Fuse-link voltage drop		5.4	X	X	X	—	—	—	—
4	Strength of terminals		5.10	X	X	X	—	—	—	—
5	Environmental conditions	Climatic load	5.6	—	—	—	X	—	—	—
6		Chemical load		—	—	—	—	X	—	—
7		Mechanical load		—	—	—	—	—	X	—
8	Transient current cycling		5.5	—	—	—	—	—	—	X
9	Fuse-link voltage drop		5.4	—	—	—	X	X	X	X
10	Current steps		5.8	—	—	X	—	—	—	—
11	Breaking capacity		5.9	X	—	—	—	—	—	—
12	Operating time rating test	I_R^a	5.7	—	X	—	X	X	X	X
		$1,35 I_R$		—	Y	—	Y	Y	Y	Y
		$1,60 I_R$		—	Y	—	Y	Y	Y	Y
		$2,00 I_R$		—	Y	—	Y	Y	Y	Y
		$3,50 I_R$		—	Y	—	Y	Y	Y	Y
		$6,00 I_R$		—	Y	—	Y	Y	Y	Y
Each sample group shall contain a minimum of 10 fuse-links for each rated current.										
For the operating time rating tests marked “Y”, the sample groups 2, 4, 5, 6 and 7 shall be divided equally. These fuse-links are intended to be subjected to a single operating time rating test only.										
NOTE A dash (—) indicates that the test is not required.										
^a Not required for 60 A fuse-link.										

Table 2 (continued)

No	Test	Clause/subclause	Sample groups						
			1	2	3	4	5	6	7
1	Dimensions	6	X	X	X	—	—	—	—
2	Marking, labelling and colour coding	4	X	X	X	X	X	X	X
3	Fuse-link voltage drop	5.4	X	X	X	—	—	—	—
4	Strength of terminals	5.10	X	X	X	—	—	—	—
13	Strength of terminals	5.10	X	X	X	X	X	X	X
Each sample group shall contain a minimum of 10 fuse-links for each rated current. For the operating time rating tests marked “Y”, the sample groups 2, 4, 5, 6 and 7 shall be divided equally. These fuse-links are intended to be subjected to a single operating time rating test only. NOTE A dash (—) indicates that the test is not required. ^a Not required for 60 A fuse-link.									

5.3 Test cable sizes

Test cable sizes shall be as given in [Table 3](#). All tests for a particular fuse-link rating shall be performed using the same cable size.

Test cable sizes are specified to allow comparative fuse-link tests to be carried out. The cable size specified herein does not necessarily indicate the size of cable to be used in the vehicle application.

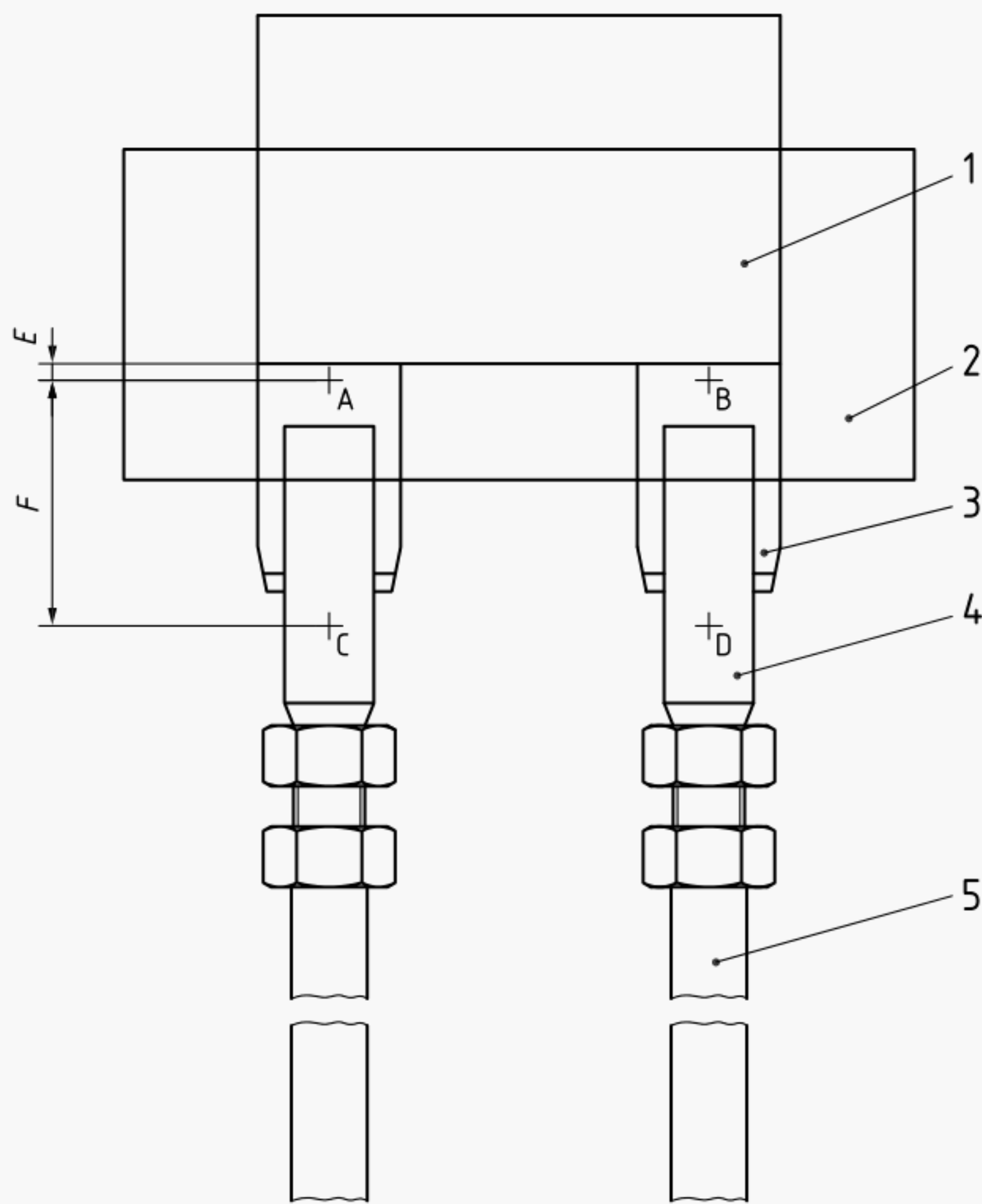
Table 3 — Test cable sizes

Rated current, I_R A	Conductor cross-sectional area ^a mm ²	Length mm
20	1,5	>450
25	2,5	
30		
35	4,0	
40		
50	6,0	
60		
^a Conductor material according to ISO 6722-1.		

5.4 Voltage drop

5.4.1 Tests

The voltage drop U_{AB} shall be measured at points A and B across the fuse-link tabs as shown in [Figure 1](#)



- Key**
- 1 fuse-link
 - 2 test fixture
 - 3 fuse blade
 - 4 test clip (cantilevered contact system, receptacle to accept tabs as defined in [Table 7](#))
 - 5 cable size according to [Table 3](#)
 - E (1,5 ± 0,5) mm
 - F (15,5 ± 1) mm

NOTE Points A and B are the measuring points for the voltage drop. Points A-C and B-D are the measuring points for connection resistance.

Figure 1 — Test schematic

5.4.2 Requirements

See [Table 4](#).

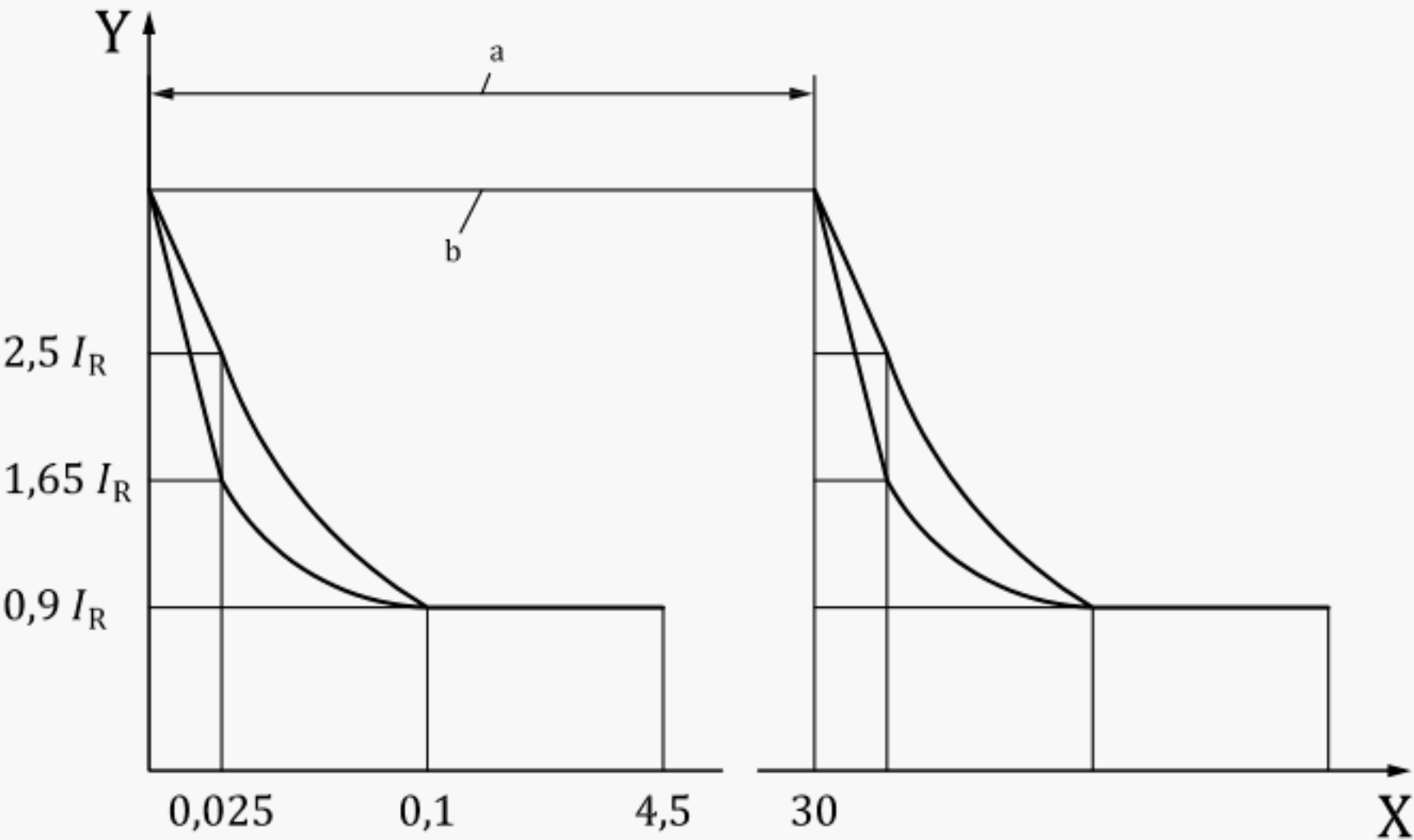
Table 4 — Voltage drop

Rated current, I_R	Maximum voltage drop, U_{AB}
A	mV
20	125
25	
30	120
35	
40	
50	
60	

5.5 Transient current cycling

5.5.1 Test

See [Figure 2](#) and ISO 8820-1. At an elapsed time of 0,025 s on-time, the current shall fall to a value between $1,65 I_R$ and $2,5 I_R$. At no time during the first 4,5 s of each cycle the steady state current shall fall below $0,9 I_R$.



Key

- X time (s)
- Y current
- a One cycle.
- b $(5,6 \dots 6) I_R$.

Figure 2 — Transient current cycling

5.5.2 Requirements

See ISO 8820-1.

5.6 Environmental conditions

See ISO 8820-1.

5.7 Operating time rating

5.7.1 Test

See ISO 8820-1. For I_R the test duration is 100 h.

5.7.2 Requirements

See [Table 5](#).

After activation, the current through the fuse-link shall not exceed 0,5 mA at the rated voltage of the fuse-link.

Table 5 — Operating times

Test current A	Operating time	
	min.	max.
I_R^a	360 000	∞
$1,35 I_R$	60	900
$1,6 I_R$	10	200
$2,0 I_R$	2	60
$3,5 I_R$	0,2	7,0
$6 I_R$	0,04	1,0
^a Not required for 60 A fuse-link.		

5.8 Current steps

5.8.1 Test

See ISO 8820-1.

5.8.2 Requirement

See ISO 8820-1. After activation, the current through the fuse-link shall not exceed 0,5 mA at the rated voltage of the fuse-link.

5.9 Breaking capacity

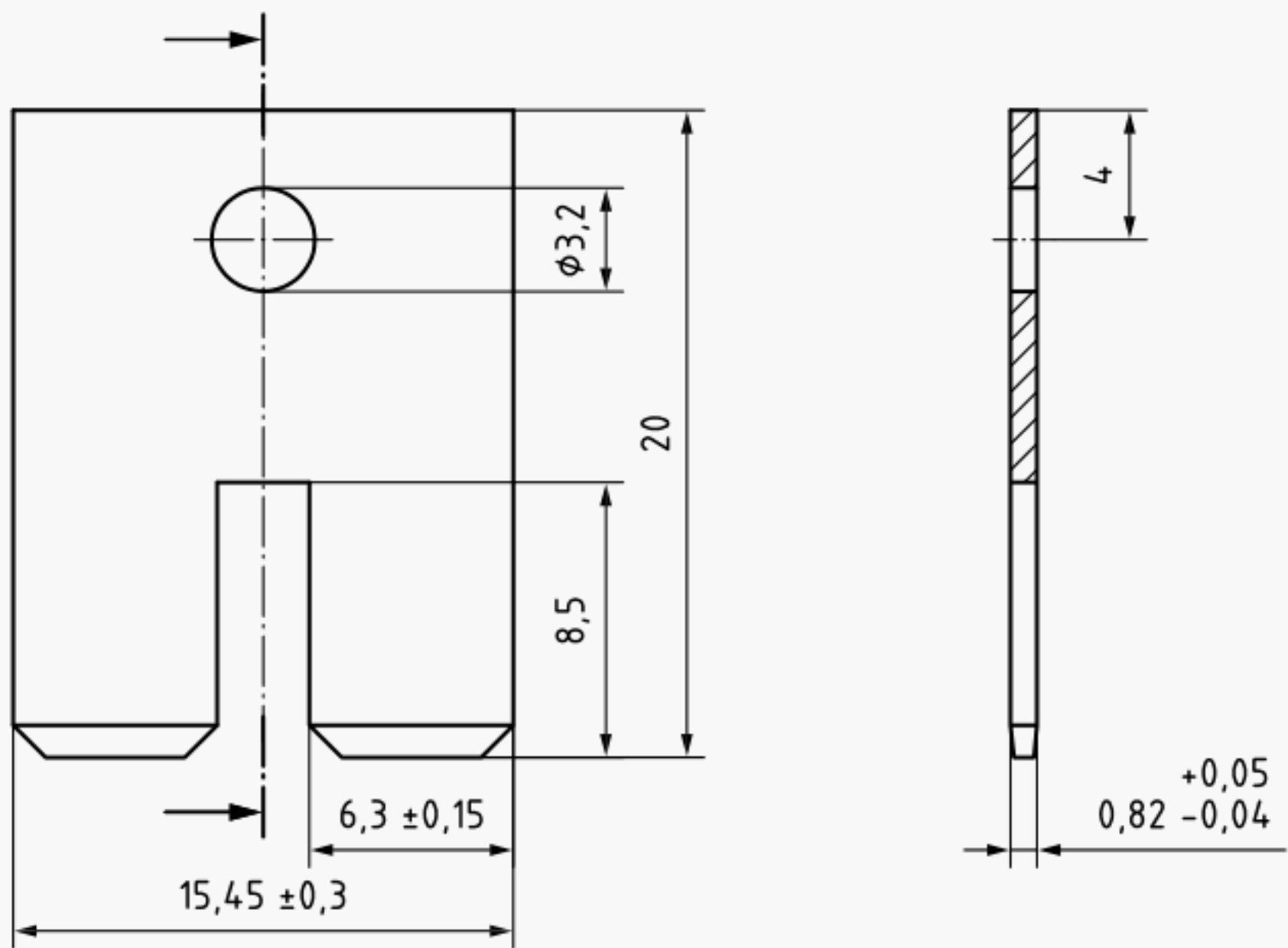
5.9.1 Test

See ISO 8820-1.

Test at 1 000 A with cable sizes as shown in [Table 3](#).

Use appropriate test dummy according to [Figure 3](#).

Dimensions in millimetres



Where not specified in the figure, the common tolerances shall be in accordance with tolerance class m as specified in ISO 2768-1.

Figure 3 — Test dummy for Type L fuse-links

5.9.2 Requirement

See ISO 8820-1.

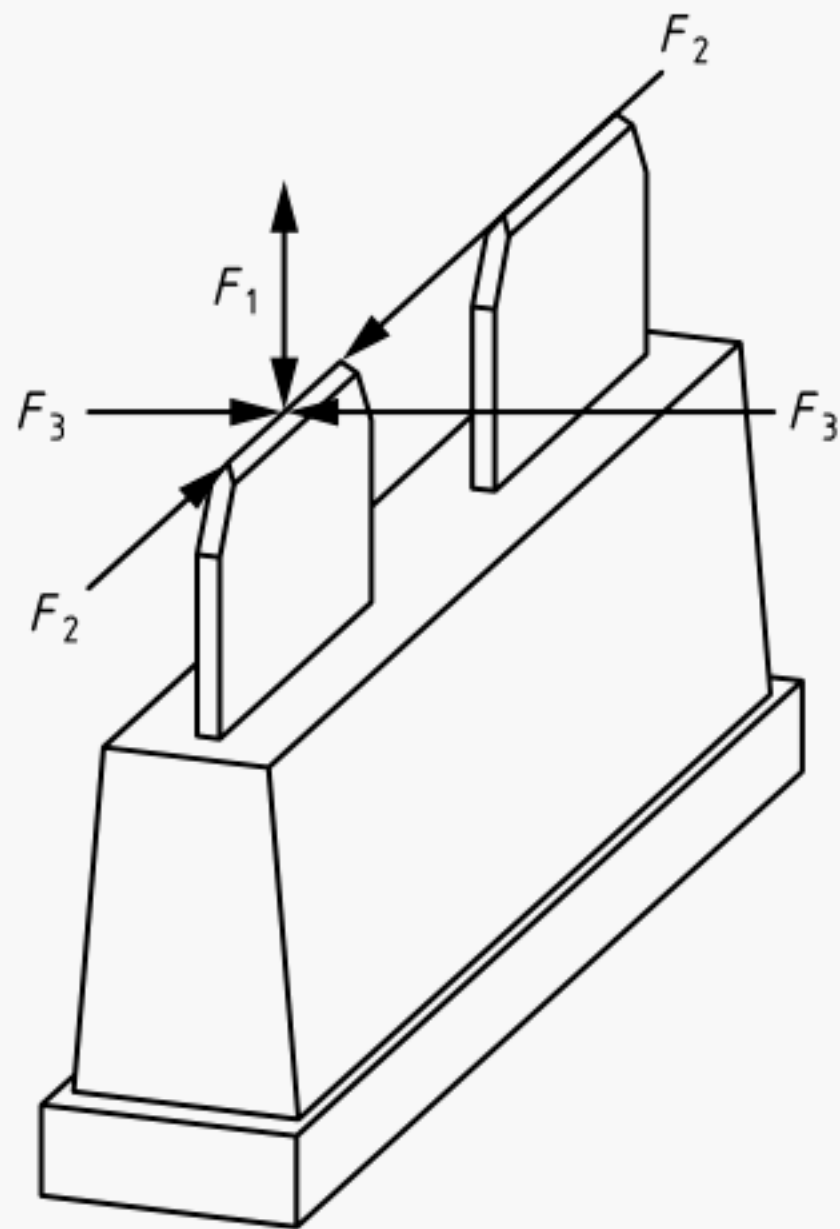
After the test, the current through the fuse-link shall not exceed 0,5 mA at the rated voltage of the fuse-link.

5.10 Strength of terminals

See [Table 6](#).

Table 6 — Terminal forces

F_1 N	F_2 N	F_3 N
70 ± 1	15 ± 1	$7,5 \pm 1$



NOTE The arrows indicate the directions of applied forces $F_1 \dots F_3$.

Figure 4 — Application of forces

5.10.1 Test

A force ($F_1 \dots F_3$) shall be applied to each of the tabs of the fuse-link in accordance with [Figure 4](#). The force shall be held for 2 s. The test force shall not be applied abruptly.

5.10.2 Requirements

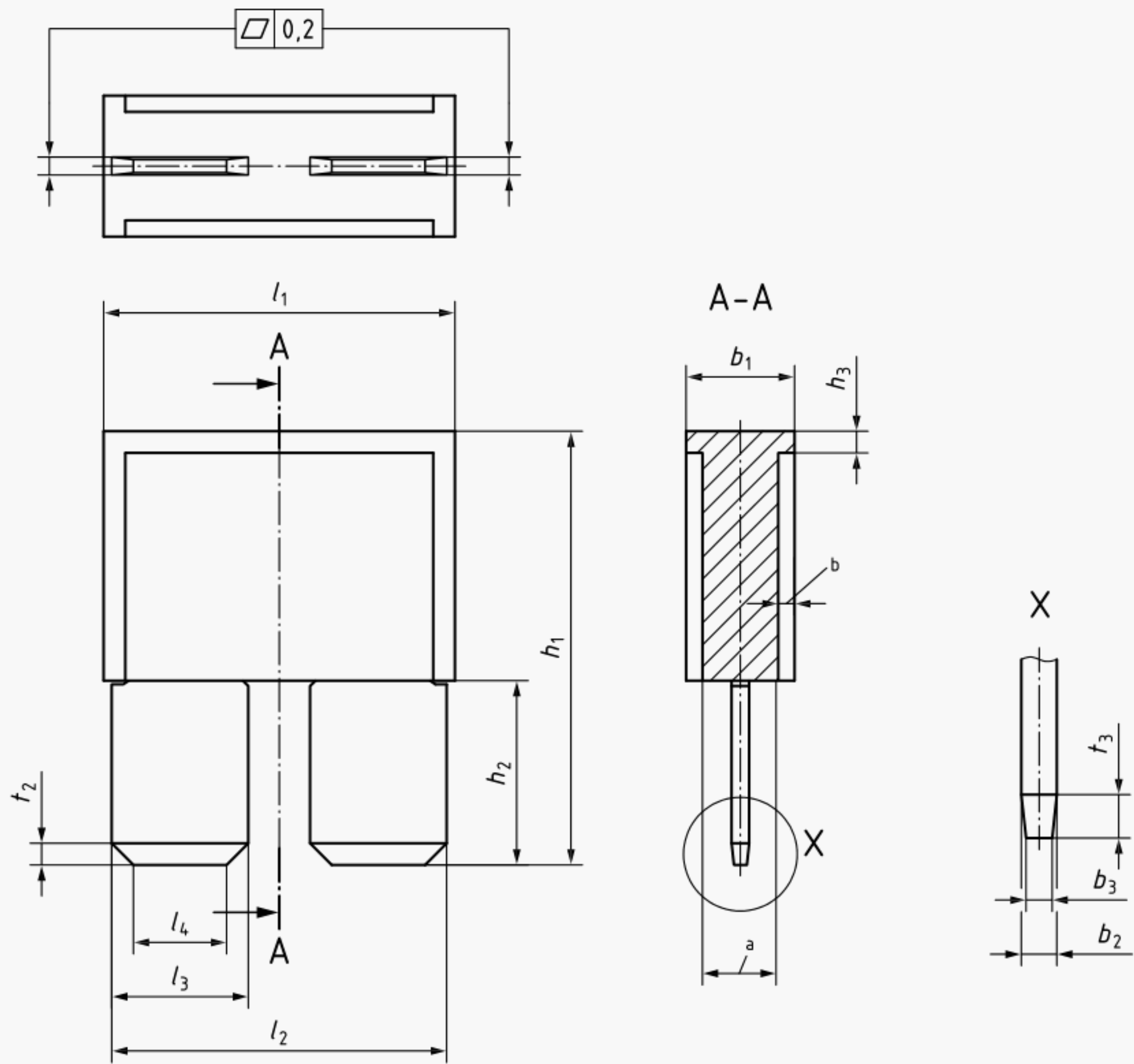
The deformation of the test sample shall not exceed 0,5 mm. After the test, the insulator shall be intact and the terminals shall not be removed from the insulator.

5.11 Temperature rise

See [Annex A](#).

6 Dimensions

Dimensions in millimetres



Key

- t_2, t_3 taper
- a Within the outline of fuse-link housing, the tabs shall be insulated.
- b Access area for the extraction tool according to the manufacturer's choice.

Figure 5 — Fuse-link Type L

Table 7 — Dimensions of fuse-links with tabs, Type L

Dimension	Value	Tolerance
l_1	16,2	$\pm 0,3$
l_2	15,45	$\pm 0,3$
l_3	6,3	$\pm 0,2$
l_4	4,3	$\pm 0,5$
b_1	6,5	$\pm 0,3$
b_2	0,82	$\pm 0,05$
b_3	0,6	max.
h_1	19	$\pm 1,5$
h_2	8,5	+0,2 -0,5
h_3	1	$\pm 0,5$

6.1 Designation example

Designation of a fuse-link Type L in accordance with this document for the rated current of 30 A:

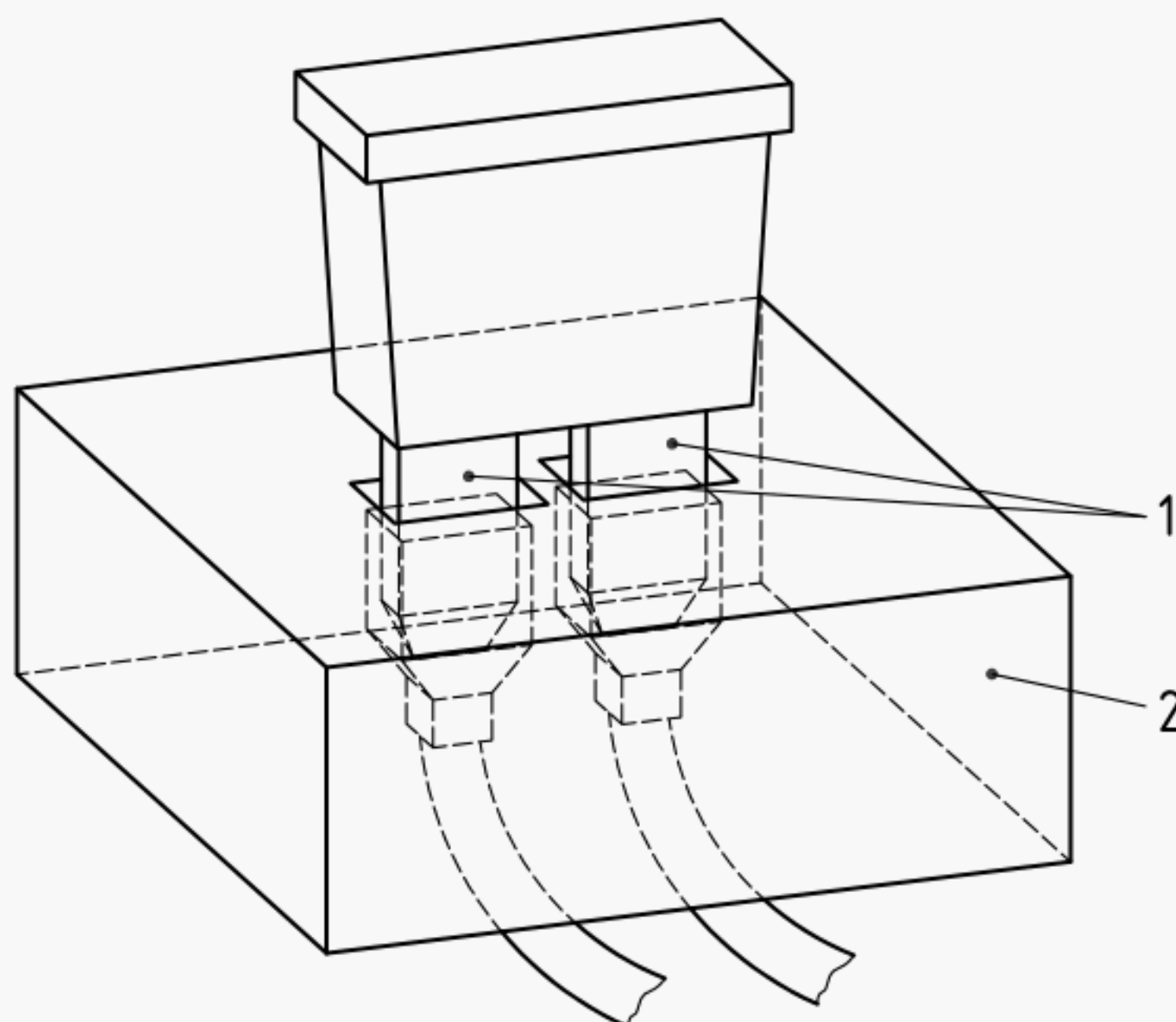
Fuse-link ISO 8820 – L – 30

Annex A (informative)

Temperature rise test

A.1 Test

The test shall be carried out using fuse-links, fuse holders and connections as specified by the vehicle manufacturer. Test cable sizes shall be in accordance with [Table 3](#). The test shall be performed in an oven with a test current of $0,5 I_R$ at an ambient temperature of 85 °C. The temperature shall be measured at the point the fuse-link terminals protrude from the base of the insulator using thermocouples as specified by the vehicle manufacturer (see [Figure A.1](#)).



Key

- 1 test points
- 2 test fixture

Figure A.1 — Temperature rise test setup

A.2 Requirement

After thermal equilibrium has been achieved, the temperature of the connections shall not exceed 125 °C.

Bibliography

[1] ISO 6722-1, *Road vehicles — 60 V and 600 V single-core cables — Part 1: Dimensions, test methods and requirements for copper conductor cables*

[2] ISO 8820-2, *Road vehicles — Fuse-links — Part 2: User guidelines*

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